Overview

Models

HP X132 10G SFP+ LC SR Transceiver	J9150A
HP X132 10G SFP+ LC LR Transceiver	J9151A
HP X132 10G SFP+ LC LRM Transceiver	J9152A
HP X132 10G SFP+ LC ER Transceiver	J9153A

Technical Specifications

HP X132 10G SFP+ LC SR Transceiver (J9150A)

A 10-Gigabit transceiver in SFP+ form-factor that supports the 10-Gigabit SR standard, providing 10-Gigabit connectivity up to 300 m on multimode fiber.

Ports		1 LC 10-GbE port (IEEE 802.3ae Type 10Gbase-SR); Duplex: full only
Connectivity	**Connector type**	LC
	Wavelength	850 nm
Physical characteristics	**Dimensions**	2.19(d) x 0.54(w) x 0.47(h) in. (5.57 x 1.38 x 1.19 cm)
	Weight	0.04 lb. (0.02 kg)
	Transceiver form factor	SFP+
Environment	**Operating temperature**	32°F to 158°F (0°C to 70°C)
	Operating relative humidity	0% to 85%, noncondensing
	Nonoperating/Storage temperature	-40°F to 185°F (-40°C to 85°C)
	Altitude	up to 10,000 ft. (3 km)
Electrical characteristics	**Power consumption typical**	0.6 W
	Power consumption maximum	0.8 W
Cabling		Cable type: 62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively; Maximum distance: ● 2-26m with 62.5 µm multimode cable @ 160 MHz*km ● 2-33m with 62.5 µm multimode cable @ 200 MHz*km ● 2-66m with 50 µm multimode cable @ 400 MHz*km ● 2-82m with 50 µm multimode cable @ 500 MHz*km ● 2-300m with 50 µm multimode cable @ 2000 MHz*km
	Cable length	2-300m
	Fiber type	Multi Mode
Notes		For fiber patch cords, use Ultra Physical Contact (UPC) surface termination/polish. Angled Physical Contact (APC) is not recommended.
Services		Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Technical Specifications

HP X132 10G SFP+ LC LR Transceiver (J9151A) A 10-Gigabit transceiver in SFP+ form-factor that supports the 10-Gigabit LR standard, providing 10-Gigabit connectivity up to 10 km on single-mode fiber.	**Ports**		1 LC 10-GbE port (IEEE 802.3ae Type 10Gbase-LR); Duplex: full only
	Connectivity	**Connector type**	LC
		Wavelength	1310 nm
	Physical characteristics	**Dimensions**	2.19(d) x 0.54(w) x 0.47(h) in. (5.57 x 1.38 x 1.19 cm)
		Weight	0.04 lb. (.02 kg)
		Transceiver form factor	SFP+
	Environment	**Operating temperature**	32°F to 158°F (0°C to 70°C)
		Operating relative humidity	0% to 85%, noncondensing
		Nonoperating/Storage temperature	-40°F to 185°F (-40°C to 85°C)
		Altitude	up to 10,000 ft. (3 km)
	Electrical characteristics	**Power consumption typical**	0.9 W
		Power consumption maximum	1 W
	Cabling		Cable type: Low metal content, single-mode fiber-optic, complying with ITU-T G.652 and ISO/IEC 793-2 Type B1; Maximum distance: • 2m-10km with 9/125 µm single-mode cable
		Cable length	2m to 10km
		Fiber type	Single Mode
	Notes		Conditioning patch cord cables are not supported. For fiber patch cords, use Ultra Physical Contact (UPC) surface termination/polish. Angled Physical Contact (APC) is not recommended.
	Services		Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

HP X132 10G SFP+ LC LRM Transceiver (J9152A) A 10-Gigabit transceiver in SFP+ form-factor that supports the 10-Gigabit LRM standard, for 10-Gigabit connectivity up to 220 m on legacy multimode fiber.	**Ports**		1 LC 10-GbE port (IEEE 802.3aq Type 10Gbase-LRM); Duplex: full only
	Connectivity	**Connector type**	LC
		Wavelength	1310 nm
	Physical characteristics	**Dimensions**	2.19(d) x 0.54(w) x 0.47(h) in. (5.57 x 1.38 x 1.19 cm)
		Weight	0.04 lb. (.02 kg)
		Transceiver form factor	SFP+
	Environment	**Operating temperature**	32°F to 158°F (0°C to 70°C)
		Operating relative humidity	0% to 85%, noncondensing
		Nonoperating/Storage temperature	-40°F to 185°F (-40°C to 85°C)
		Altitude	up to 10,000 ft. (3 km)
	Electrical characteristics	**Power consumption typical**	0.7 W
		Power consumption maximum	1 W

Technical Specifications

	Cabling		Cable type: 62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively (a mode conditioning patch cord may be needed in some multimode fiber installations); Maximum distance: • 0.5-220m with 62.5 µm multimode cable @ 160/500 MHz*km • 0.5-220m with 62.5 µm multimode cable @ 200/500 MHz*km • 0.5-100m with 50 µm multimode cable @ 400/400 MHz*km • 0.5-220m with 50 µm multimode cable @ 500/500 MHz*km • 0.5-220m with 50 µm multimode cable @ 1500/500 MHz*km **Cable length** 0.5m to 220m **Fiber type** Multi Mode
	Notes		For OM3 cable (50 µm multimode @ 1500/500 MHz*km), a mode-conditioning patch cord is not required. Other multimode cables may require mode-conditioning patch cords to achieve the maximum distances listed above. For fiber patch cords, use Ultra Physical Contact (UPC) surface termination/polish. Angled Physical Contact (APC) is not recommended.
	Services		Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
HP X132 10G SFP+ LC ER Transceiver (J9153A) The SFP+ ER Transceiver will transmit 10Gbps over up to 40km using standard OM3 fiber cable. This product expands the HP Networking transceiver portfolio for connections from 0m to 40km. Use only genuine HP transceivers with your HP Networking equipment to ensure reliability and support.	**Ports**		1 LC 10-GbE port (IEEE 802.3ae Type 10Gbase-ER); Duplex: full only
	Connectivity	**Connector type**	LC
		Wavelength	1550 nm
	Physical characteristics	**Dimensions**	2.22(d) x 0.55(w) x 0.47(h) in. (5.65 x 1.39 x 1.19 cm)
		Weight	.04 lb., Fully loaded
		Transceiver form factor	SFP+
	Environment	**Operating temperature**	32°F to 158°F (0°C to 70°C)
		Operating relative humidity	5% to 95%, noncondensing
		Nonoperating/Storage temperature	-40°F to 185°F (-40°C to 85°C)
		Nonoperating/Storage relative humidity	5% to 95%, noncondensing
		Altitude	up to 10,000 ft. (3 km)
	Electrical characteristics	**Power consumption typical**	1.3 W
		Power consumption maximum	1.5 W
	Cabling		Cable type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 40km **Fiber type** Single Mode

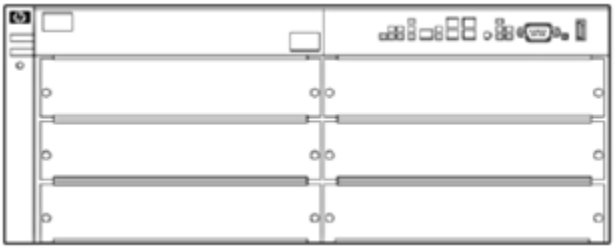
Technical Specifications

Notes	Check switch release notes for minimum version of software required to support this transceiver. Some switches have limits as to how many of this particular transceiver can be installed. See the release notes of the switch software/firmware being used for more details.
Services	Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

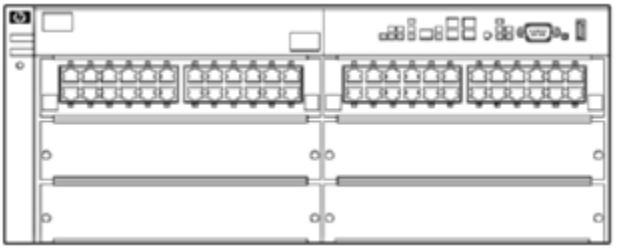
To learn more, visit: www.hp.com/networking

© Copyright 2010 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

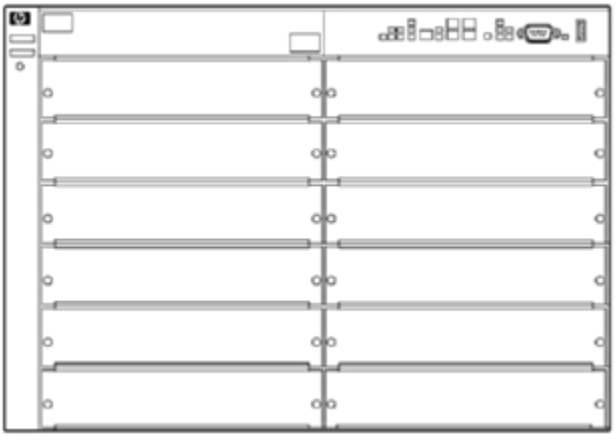
Overview



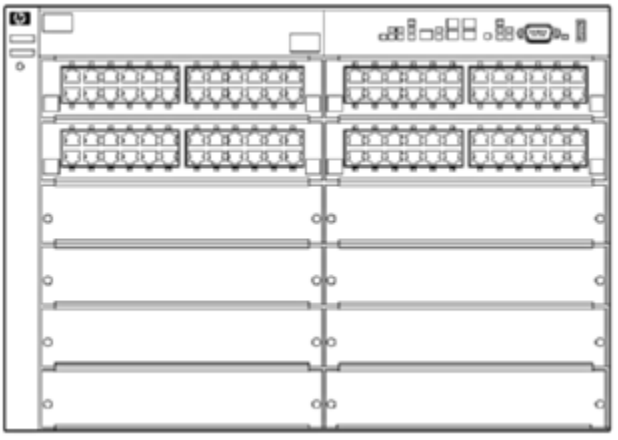
HP E5406 zl Switch Chassis



HP E5406-48G zl Switch



HP E5412 zl Switch Chassis



HP E5412-96G zl Switch

Models

HP E5406 zl Switch with Premium Software	J9642A
HP E5412 zl Switch with Premium Software	J9643A
HP E5406-44G-PoE+/2XG-SFP+ v2 zl Switch with Premium Software	J9533A
HP E5412-92G-PoE+/2XG-SFP+ v2 zl Switch with Premium Software	J9532A
HP E5406-44G-PoE+/4G-SFP v2 zl Switch with Premium Software	J9539A
HP E5412-92G-PoE+/4G-SFP v2 zl Switch with Premium Software	J9540A
HP E5406-44G-PoE+/4SFP zl Switch	J9447A
HP E5412-92G-PoE+/4SFP zl Switch	J9448A
HP E5406 zl Switch Chassis	J8697A
HP E5412 zl Switch Chassis	J8698A
HP E5406-48G zl Switch	J8699A
HP E5412-96G zl Switch	J8700A

Key Features

- Advanced access layer, distribution & Core
- Integrated L2 to L4 intelligent edge feature set
- Enterprise-class performance and security
- HP Alliance ONE integrated
- Scalable 10/100/1000 and 10 GbE connectivity

Overview

Product overview

The HP E5400 zl Switch Series consists of advanced intelligent switches in the HP E-Series product-line. The E5400 zl series includes 6-slot and 12-slot chassis and associated zl modules and bundles. The foundation for all of these switches is a purpose-built,
programmable ProVision ASIC that allows the most demanding networking features, such as quality of service (QoS) and security, to be implemented in a scalable yet granular fashion. With 10/100, Gigabit Ethernet and 10 Gigabit Ethernet interfaces, choice of PoE+ & Non-PoE, integrated layer 3 features and HP allianceONE Solutions, the E5400 zl switches offer excellent investment protection, flexibility, and scalability, as well as ease of deployment, operation, and maintenance.

Features and Benefits

Quality of Service (QoS)

- **Advanced classifier-based QoS**: classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis
- **Layer 4 prioritization**: enables prioritization based on TCP/UDP port numbers
- **Traffic prioritization**: allows real-time traffic classification into eight priority levels mapped to eight queues
- **Bandwidth shaping**:
  - **Port-based rate limiting**: provides per-port ingress/egress enforced maximum bandwidth
  - **Classifier-based rate limiting**: uses access control list (ACL) to enforce maximum bandwidth for ingress traffic on each port
  - **Guaranteed minimum**: provides per-port, per-queue egress-based guaranteed minimum bandwidth
- **Class of Service** (CoS): sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ

Management

- **Remote Intelligent Mirroring**: mirrors selected ingress/egress traffic based on ACL, port, MAC address, or VLAN to a local or remote E8200, E6200, E5400, or E3500 switch anywhere on the network
- **RMON, XRMON, and sFlow v5**: provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- **IEEE 802.1AB Link Layer Discovery Protocol** (LLDP): automated device discovery protocol provides easy mapping by network management applications
- **Uni-Directional Link Detection** (UDLD): monitors cable between two switches and shuts down the ports on both ends if the cable is broken, turning the bi-directional link into uni-directional; this prevents network problems such as loops
- **Management simplicity**: includes HP E-Series common networking features and CLI implementation (common across HP E5400/E8200/E6200/E6600/E3500 switches)
- **Command authorization**: leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; also provides an audit trail
- **Friendly port names**: allow assignment of descriptive names to ports
- **Dual flash images**: provide independent primary and secondary operating system files for backup while upgrading
- **Multiple configuration files**: can be stored to the flash image

Connectivity

- **NEW IEEE 802.3az Energy Efficient Ethernet**: Lowers power consumption in periods of low link usage. (Supported on v2 zl 10/100/1000 & 10/100 modules)
- **IEEE 802.3af Power over Ethernet (PoE):** provides up to 15.4 W per port to IEEE 802.3af-compliant PoE-powered devices such as IP phones, wireless access points, and security cameras
- **IEEE 802.3at Power Over Ethernet Plus**: provides up to 30 W per port to IEEE 802.3 for PoE-/PoE+-powered devices such as video IP phones, IEEE 802.11n wireless access points, and advanced pan/zoom/tilt security cameras
- **Prestandard PoE support**: detects and provides power to prestandard PoE devices; see list of supported devices in the product FAQ at www.hp.com/networking
- **High-density port connectivity**: up to 12 interface module slots and up to 288 wire-speed 10/100/1000 PoE-enabled ports or 48 10-GbE ports per system
- **Jumbo frames**: on Gigabit and 10-Gigabit ports, allow high-performance remote backup and disaster-recovery

Overview

services
- **Auto-MDIX**: automatically adjusts for straight-through or crossover cables on all 10/100 and 10/100/1000 ports
- **IPv6**:
  - **IPv6 host**: enables switches to be managed and deployed at the IPv6 network's edge
  - **Dual stack** (IPv4 and IPv6): transitions from IPv4 to IPv6, supporting connectivity for both protocols
  - **MLD snooping**: forwards IPv6 multicast traffic to the appropriate interface
  - **IPv6 ACL/QoS**: supports ACL and QoS for IPv6 network traffic, preventing traffic flooding
  - **IPv6 routing**: supports static and OSPFv3 routing protocols

Performance

- **High-speed/capacity architecture**: 1 Tbps crossbar switching fabric provides intra-module and inter-module switching with 585.6 million pps throughput on the purpose-built ProVision ASICs
- **Selectable queue configurations**: increase performance by selecting the number of queues and associated memory buffering that best meet the requirements of your network applications

Resiliency and high availability

- **Virtual Router Redundancy Protocol** (requires Premium License): allows groups of two routers to dynamically back each other up to create highly available routed environments
- **IEEE 802.1s Multiple Spanning Tree Protocol**: provides high link availability in multiple VLAN environments by allowing multiple spanning trees; encompasses IEEE 802.1D Spanning Tree Protocol and IEEE 802.1w Rapid Spanning Tree Protocol
- **Server-to-switch distributed trunking**: allows a server to connect to two switches with one logical trunk that consists of multiple physical connections; enables load-balancing and increases resiliency
- **IEEE 802.3ad Link Aggregation Control Protocol** (LACP) **and HP port trunking**: support up to 60 trunks, each with up to 8 links (ports) per trunk
- **Optional redundant power supply** (HP E5400 series): provides uninterrupted power and allows hot-swapping of the redundant power supplies when installed
- **Hot-swappable modules** (E5400 series): permits modules, mini-GBICs, and power supplies in a redundant power supply configuration to be added or swapped without interrupting the network
- **Sparing simplicity**: HP zl-common accessories (interface modules, power supplies)

Layer 2 switching

- **HP's switch meshing**: dynamically load-balances across multiple active redundant links to increase available aggregate bandwidth
- **VLAN support and tagging**: supports the IEEE 802.1Q standard and 2,048 VLANs simultaneously
- **IEEE 802.1v protocol VLANs**: isolate select non-IPv4 protocols automatically into their own VLANs
- **GARP VLAN Registration Protocol** (GVRP): allows automatic learning and dynamic assignment of VLANs
- **802.1ad QinQ**: increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on high-speed campus or metro network

Layer 3 services

- **User Datagram Protocol** (UDP) **helper function**: allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses and prevents server spoofing for UDP services such as DHCP
- **Loopback interface address**: defines an address in Routing Information Protocol (RIP) and OSPF that can always be reachable, improving diagnostic capability
- **NEW Route maps**: provide more control during route redistribution; allow filtering and altering of route metrics

Layer 3 routing

- **NEW Static IP routing**: provides manually configured routing for both IPv4 and IPv6 networks
- **Routing Information Protocol** (RIP): provides RIPv1 and RIPv2 routing
- **NEW OSPF** (requires Premium License): provides OSPFv2 for IPv4 routing and OSPFv3 for IPv6 routing

Security

- **Access control lists** (ACLs): provide filtering based on the IP field, source/destination IP address/subnet, and

Overview

source/destination TCP/UDP port number on a per-VLAN or per-port basis

- **Multiple user authentication methods**:
  - **IEEE 802.1X users per port**: provides authentication of multiple IEEE 802.1X users per port; prevents user "piggybacking" on another user's IEEE 802.1X authentication
  - **Web-based authentication**: authenticates from Web browser for clients that do not support IEEE 802.1X supplicant; customized remediation can be processed on an external Web server
  - **MAC-based authentication**: client is authenticated with the RADIUS server based on client's MAC address
  - **Concurrent IEEE 802.1X, Web, and MAC authentication schemes per port**: switch port will accept up to 32 sessions of IEEE 802.1X, Web, and MAC authentications
- **Virus throttling**: detects traffic patterns typical of WORM-type viruses and either throttles or entirely prevents the virus from spreading across the routed VLANs or bridged interfaces, without requiring external appliances
- **DHCP protection**: blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- **Secure management access**: securely encrypts all access methods (CLI, GUI, or MIB) through SSHv2, SSL, and/or SNMPv3
- **USB Secure Autorun** (requires HP PCM+): deploys, diagnoses, and updates switch using a USB flash drive; works with a secure credential to prevent tampering
- **Switch CPU protection**: provides automatic protection against malicious network traffic trying to shut down the switch
- **ICMP throttling**: defeats ICMP denial-of-service attacks by enabling any switch port to automatically throttle ICMP traffic
- **Identity-driven ACL**: enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- **STP BPDU port protection**: blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- **Dynamic IP lockdown**: works with DHCP protection to block traffic from unauthorized hosts, preventing IP source address spoofing
- **Dynamic ARP protection**: blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- **STP Root Guard**: protects root bridge from malicious attack or configuration mistakes
- **Detection of malicious attacks**: monitors 10 types of network traffic and sends a warning when an anomaly that potentially can be caused by malicious attacks is detected
- **Port security**: allows access only to specified MAC addresses, which can be learned or specified by the administrator
- **MAC address lockout**: prevents particular configured MAC addresses from connecting to the network
- **Source-port filtering**: allows only specified ports to communicate with each other
- **RADIUS/TACACS+**: eases switch management security administration by using a password authentication server
- **Secure Shell** (SSHv2): encrypts all transmitted data for secure, remote command-line interface (CLI) access over IP networks
- **Secure Sockets Layer** (SSL): encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- **Secure File Transfer Protocol** (FTP): allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of switch configuration file
- **Management Interface Wizard**: helps ensure that management interfaces such as SNMP, telnet, SSH, SSL, Web, and USB are secured to the desired level
- **Switch management logon security**: can require either RADIUS or TACACS+ authentication for secure switch CLI logon
- **Security banner**: displays a customized security policy when users log in to the switch

Convergence

- **IP multicast routing**: includes PIM Sparse and Dense modes to route IP multicast traffic
- **IP multicast snooping (data-driven IGMP)**: automatically prevents flooding of IP multicast traffic
- **LLDP-MED (Media Endpoint Discovery)**: is a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones
- **RADIUS VLAN for voice**: uses standard RADIUS attribute and LLDP-MED to automatically configure VLAN for IP phones
- **PoE allocations**: support multiple methods (automatic, IEEE 802.3af class, LLDP-MED, or user specified) to allocate PoE power for more efficient energy savings

Warranty and support

Overview

- **Lifetime warranty**: for as long as you own the product with advance replacement and next-business-day delivery (available in most countries)*
- **Electronic and telephone support**: limited electronic and telephone support is available from HP; refer to: www.hp.com/networking/warranty for details on the support provided and the period during which support is available
- **Software releases**: refer to: www.hp.com/networking/warranty for details on the software releases provided and the period during which software releases are available for your product(s)

* Hardware warranty replacement for as long as you own the product, with next business day advance replacement (available in most countries) with a five-year hardware warranty replacement for the disk drive included with HP AllianceONE Services zl Module, HP Threat Management Services zl Module, HP PCM+ Agent with AllianceONE Services zl Module, and HP E-MSM765 zl Mobility Controller. For details, refer to the HP Software License, Warranty, and Support booklet at: www.hp.com/networking/warranty.

HP E5406 zl Switch with Premium Software (J9642A)	**Included accessories**	1 HP E5400 zl Switch Premium License (J8994A)	
	Ports	6 open module slots Supports a maximum of 48 10-GbE ports or 144 autosensing 10/100/1000 ports or 144 mini-GBICs, or a combination	
	Power supplies	2 power-supply slots	
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 6.9(h) in. (45.09 x 44.45 x 17.53 cm) (4U height)
		Weight	23.55 lb. (10.68 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
		Throughput	up to 282.1 million pps
		Routing/Switching capacity	379.2 Gbps
		Switch fabric speed	379.2 Gbps
		Routing table size	10,000 entries
		MAC address table size	64,000 entries
	Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
		Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
		Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
		Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
		Altitude	up to 10,000 ft. (3 km)
		Acoustic	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
	Electrical characteristics	Achieved Miercom Certified Green Award	
		Description	Chassis ships without power supplies. Two power supply slots are available; three different power supplies are available. See power supply products for additional specifications
		Maximum heat dissipation	2450 BTU/hr (2584 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
		Voltage	100-127 / 200-240 VAC
		Frequency	50 / 60 Hz

	Notes	Power supplies must be ordered separately. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE250E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE251E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE252E) 3-year, 24x7 SW phone support, software updates (UF786E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR900E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR901E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR902E) 4-year, 24x7 SW phone support, software updates (UR903E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR904E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR905E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR906E) 5-year, 24x7 SW phone support, software updates (UR907E) 3 Yr 6 hr Call-to-Repair Onsite (UW377E) 4 Yr 6 hr Call-to-Repair Onsite (UW378E) 5 Yr 6 hr Call-to-Repair Onsite (UW379E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your	

	local HP sales office.	
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEIEEE 802.1ad Q-in-Q IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
	IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode RFC 4601 Draft 10 PIM Sparse Mode
	IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup

	Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)

			SNMPv1/v2c/v3 XRMON
		OSPF	RFC 2328 OSPFv2 RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6
		QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
		Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell

HP E5412 zl Switch with Premium Software (J9643A)	**Included accessories**	1 HP E5400 zl Switch Premium License (J8994A)	
	Ports	12 open module slots Supports a maximum of 96 10-GbE ports or 288 autosensing 10/100/1000 ports or 288 mini-GBICs, or a combination	
	Power supplies	4 power-supply slots	
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 12.1(h) in. (45.09 x 44.45 x 30.73 cm) (7U height)
		Weight	34.94 lb. (15.85 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
		Throughput	up to 564.2 million pps
		Routing/Switching capacity	758.4 Gbps
		Switch fabric speed	758.4 Gbps
		Routing table size	10,000 entries
		MAC address table size	64,000 entries
	Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
		Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
		Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)

	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296
Electrical characteristics		
	Description	Chassis ships without power supplies. Four power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	4900 BTU/hr (5169 kJ/hr), (max. non-PoE); 7400 BTU/hr (7,807 kJ/hr) (max. using PoE)
	Voltage	100-127 / 200-240 VAC
	Frequency	50 / 60 Hz
	Notes	Power supplies must be ordered separately. Two power supplies are required to power the J8698A chassis. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE253E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE254E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE255E)	

3-year, 24x7 SW phone support, software updates (UF788E)
Installation with minimum configuration, system-based pricing (U4828E)
Installation with HP-provided configuration, system-based pricing (U4832E)
4-year, 4-hour onsite, 13x5 coverage for hardware (UR916E)
4-year, 4-hour onsite, 24x7 coverage for hardware (UR917E)
4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR918E)
4-year, 24x7 SW phone support, software updates (UR919E)
5-year, 4-hour onsite, 13x5 coverage for hardware (UR920E)
5-year, 4-hour onsite, 24x7 coverage for hardware (UR921E)
5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR922E)
5-year, 24x7 SW phone support, software updates (UR923E)
3 Yr 6 hr Call-to-Repair Onsite (UW380E)
4 Yr 6 hr Call-to-Repair Onsite (UW381E)
5 Yr 6 hr Call-to-Repair Onsite (UW382E)

Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Standards and protocols

Device Management

RFC 1591 DNS (client)
HTML and telnet management

General Protocols

IEIEEE 802.1ad Q-in-Q
IEEE 802.1AX-2008 Link Aggregation
IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1v VLAN classification by Protocol and
Port
IEEE 802.1w Rapid Reconfiguration of Spanning
Tree
IEEE 802.3ad Link Aggregation Control Protocol
(LACP)
IEEE 802.3af Power over Ethernet
IEEE 802.3x Flow Control
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 868 Time Protocol
RFC 951 BOOTP
RFC 1058 RIPv1
RFC 1350 TFTP Protocol (revision 2)
RFC 1519 CIDR
RFC 1542 BOOTP Extensions
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2453 RIPv2
RFC 2548 (MS-RAS-Vendor only)

	RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode RFC 4601 Draft 10 PIM Sparse Mode
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB

		RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
	Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
	OSPF	RFC 2328 OSPFv2 RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6
	QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
	Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell

HP E5406-44G-PoE+/2XG-SFP+ v2 zl Switch with Premium Software (J9533A)	**Included accessories**	1 HP 20-port Gig-T PoE+ / 2-port 10-GbE SFP+ v2 zl Module (J9536A) 1 HP 1500 W PoE+ zl Power Supply (J9306A) 1 HP 24-port Gig-T PoE+ v2 zl Module (J9534A) 1 HP E5400 zl Switch Premium License (J8994A)
	Ports	44 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 2 open 10-GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 16 10-GbE ports or 140 autosensing 10/100/1000 ports or 100 mini-GBICs, or a combination
	Power supplies	1 power-supply slots includes: 1 x J9306AHP 1500 W PoE+ zl Power Supply

Technical Specifications

Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 6.9(h) in. (45.09 x 44.45 x 17.53 cm) (4U height)
	Weight	46.08 lb. (20.9 kg)
Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
	10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
	Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
	10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
	Throughput	up to 282.1 million pps
	Routing/Switching capacity	379.2 Gbps
	Switch fabric speed	379.2 Gbps
	Routing table size	10,000 entries
	MAC address table size	64,000 entries
Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
	Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
	Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
Electrical characteristics		
	Description	One J9306A installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications
	Maximum heat dissipation	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
	Voltage	110-127 / 200-240 VAC
	Idle power	215 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	

Technical Specifications

Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE250E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE251E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE252E) 3-year, 24x7 SW phone support, software updates (UF786E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR900E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR901E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR902E) 4-year, 24x7 SW phone support, software updates (UR903E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR904E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR905E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR906E) 5-year, 24x7 SW phone support, software updates (UR907E) 3 Yr 6 hr Call-to-Repair Onsite (UW377E) 4 Yr 6 hr Call-to-Repair Onsite (UW378E) 5 Yr 6 hr Call-to-Repair Onsite (UW379E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEIEEE 802.1ad Q-in-Q IEEE 802.1AX-2008 Link Aggregation

	IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode RFC 4601 Draft 10 PIM Sparse Mode
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address

	Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
OSPF	RFC 2328 OSPFv2 RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6

		QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
		Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell
HP E5412-92G-PoE+/2XG-SFP+ v2 zl Switch with Premium Software (J9532A)	**Included accessories**		3 HP 24-port Gig-T PoE+ v2 zl Module (J9534A) 1 HP 20-port Gig-T PoE+ / 2-port 10-GbE SFP+ v2 zl Module (J9536A) 2 HP 1500 W PoE+ zl Power Supply (J9306A) 1 HP E5400 zl Switch Premium License (J8994A)
	Ports		92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 2 open 10-GbE SFP+ transceiver slots 8 open module slots Supports a maximum of 32 10-GbE ports or 284 autosensing 10/100/1000 ports or 196 mini-GBICs, or a combination
	Power supplies		2 power-supply slots includes: 2 x J9306AHP 1500 W PoE+ zl Power Supply
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 12.1(h) in. (45.09 x 44.45 x 30.73 cm) (7U height)
		Weight	75.36 lb. (34.18 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash Mb, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting		Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
		Throughput	up to 564.2 million pps
		Routing/Switching capacity	758.4 Gbps
		Switch fabric speed	758.4 Gbps
		Routing table size	10,000 entries
		MAC address table size	64,000 entries
	Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
		Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing

	Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296
Electrical characteristics	**Description**	Two J9306A installed. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr) (max. using PoE)
	Voltage	110-127 / 200-240 VAC
	Idle power	312 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE253E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE254E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE255E) 3-year, 24x7 SW phone support, software updates (UF788E)	

Installation with minimum configuration, system-based pricing (U4828E)
Installation with HP-provided configuration, system-based pricing (U4832E)
4-year, 4-hour onsite, 13x5 coverage for hardware (UR916E)
4-year, 4-hour onsite, 24x7 coverage for hardware (UR917E)
4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR918E)
4-year, 24x7 SW phone support, software updates (UR919E)
5-year, 4-hour onsite, 13x5 coverage for hardware (UR920E)
5-year, 4-hour onsite, 24x7 coverage for hardware (UR921E)
5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR922E)
5-year, 24x7 SW phone support, software updates (UR923E)
3 Yr 6 hr Call-to-Repair Onsite (UW380E)
4 Yr 6 hr Call-to-Repair Onsite (UW381E)
5 Yr 6 hr Call-to-Repair Onsite (UW382E)

Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Standards and protocols

Device Management

RFC 1591 DNS (client)
HTML and telnet management

General Protocols

IEIIEEE 802.1ad Q-in-Q
IEEE 802.1AX-2008 Link Aggregation
IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1v VLAN classification by Protocol and
Port
IEEE 802.1w Rapid Reconfiguration of Spanning
Tree
IEEE 802.3ad Link Aggregation Control Protocol
(LACP)
IEEE 802.3af Power over Ethernet
IEEE 802.3x Flow Control
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 868 Time Protocol
RFC 951 BOOTP
RFC 1058 RIPv1
RFC 1350 TFTP Protocol (revision 2)
RFC 1519 CIDR
RFC 1542 BOOTP Extensions
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2453 RIPv2
RFC 2548 (MS-RAS-Vendor only)
RFC 3046 DHCP Relay Agent Information

	Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode RFC 4601 Draft 10 PIM Sparse Mode
IPv6	RFRFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB

		RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
	Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
	OSPF	RFC 2328 OSPFv2 RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6
	QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
	Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell

HP E5406-44G-PoE+/4G-SFP v2 zl Switch with Premium Software (J9539A)	**Included accessories**	1 HP 24-port Gig-T PoE+ v2 zl Module (J9534A) 1 HP 20-port Gig-T PoE+ / 4-port SFP v2 zl Module (J9535A) 1 HP 1500 W PoE+ zl Power Supply (J9306A) 1 HP E5400 zl Switch Premium License (J8994A)	
	Ports	44 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 open mini-GBIC slots 4 open module sl Supports a maximum of 16 10-GbE ports or 140 autosensing 10/100/1000 ports or 100 mini-GBICs, or a combination	
	Power supplies	1 power-supply slots includes: 1 x J9306AHP 1500 W PoE+ zl Power Supply	
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 6.9(h) in. (45.09 x 44.45 x 17.53 cm) (4U height)
		Weight	45.58 lb. (20.68 kg)

Technical Specifications

Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
	10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
	Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
	10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
	Throughput	up to 282.1 million pps
	Routing/Switching capacity	379.2 Gbps
	Switch fabric speed	379.2 Gbps
	Routing table size	10,000 entries
	MAC address table size	64,000 entries
Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
	Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
	Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
Electrical characteristics	**Description**	One J9306A installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
	Voltage	110-127 / 200-240 VAC
	Idle power	215 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m

	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management		HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)
Notes		When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
Services		3-year, 4-hour onsite, 13x5 coverage for hardware (UE250E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE251E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE252E) 3-year, 24x7 SW phone support, software updates (UF786E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR900E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR901E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR902E) 4-year, 24x7 SW phone support, software updates (UR903E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR904E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR905E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR906E) 5-year, 24x7 SW phone support, software updates (UR907E) 3 Yr 6 hr Call-to-Repair Onsite (UW377E) 4 Yr 6 hr Call-to-Repair Onsite (UW378E) 5 Yr 6 hr Call-to-Repair Onsite (UW379E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEIIEEE 802.1ad Q-in-Q IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and

	Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode RFC 4601 Draft 10 PIM Sparse Mode
IPv6	RFRFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture

	RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
OSPF	RFC 2328 OSPFv2 RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6
QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
Security	IEEE 802.1X Port Based Network Access

			Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell
HP E5412-92G-PoE+/4G-SFP v2 zl Switch with Premium Software (J9540A)	**Included accessories**		3 HP 24-port Gig-T PoE+ v2 zl Module (J9534A) 1 HP 20-port Gig-T PoE+ / 4-port SFP v2 zl Module (J9535A) 2 HP 1500 W PoE+ zl Power Supply (J9306A) 1 HP E5400 zl Switch Premium License (J8994A)
	Ports		92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 open mini-GBIC slots 8 open module slots Supports a maximum of 32 10-GbE ports or 284 autosensing 10/100/1000 ports or 196 mini-GBICs, or a combination
	Power supplies		2 power-supply slots includes: 2 x J9306AHP 1500 W PoE+ zl Power Supply
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 12.1(h) in. (45.09 x 44.45 x 30.73 cm) (7U height)
		Weight	74.86 lb. (33.96 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash Mb, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting		Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
		Throughput	up to 564.2 million pps
		Routing/Switching capacity	758.4 Gbps
		Switch fabric speed	758.4 Gbps
		Routing table size	10,000 entries
		MAC address table size	64,000 entries
	Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
		Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
		Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
		Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing

	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296
Electrical characteristics	**Description**	Two J9306A installed. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr) (max. using PoE)
	Voltage	110-127 / 200-240 VAC
	Idle power	312 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE253E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE254E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE255E) 3-year, 24x7 SW phone support, software updates (UF788E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR916E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR917E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software	

phone (UR918E)
4-year, 24x7 SW phone support, software updates (UR919E)
5-year, 4-hour onsite, 13x5 coverage for hardware (UR920E)
5-year, 4-hour onsite, 24x7 coverage for hardware (UR921E)
5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR922E)
5-year, 24x7 SW phone support, software updates (UR923E)
3 Yr 6 hr Call-to-Repair Onsite (UW380E)
4 Yr 6 hr Call-to-Repair Onsite (UW381E)
5 Yr 6 hr Call-to-Repair Onsite (UW382E)

Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Standards and protocols

Device Management

RFC 1591 DNS (client)
HTML and telnet management

General Protocols

IEIIEEE 802.1ad Q-in-Q
IEEE 802.1AX-2008 Link Aggregation
IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1v VLAN classification by Protocol and
Port
IEEE 802.1w Rapid Reconfiguration of Spanning
Tree
IEEE 802.3ad Link Aggregation Control Protocol
(LACP)
IEEE 802.3af Power over Ethernet
IEEE 802.3x Flow Control
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 868 Time Protocol
RFC 951 BOOTP
RFC 1058 RIPv1
RFC 1350 TFTP Protocol (revision 2)
RFC 1519 CIDR
RFC 1542 BOOTP Extensions
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2453 RIPv2
RFC 2548 (MS-RAS-Vendor only)
RFC 3046 DHCP Relay Agent Information Option
RFC 3576 Ext to RADIUS (CoA only)
RFC 3768 VRRP
RFC 4675 RADIUS VLAN & Priority
UDLD (Uni-directional Link Detection)

IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode RFC 4601 Draft 10 PIM Sparse Mode
IPv6	RFRFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge

		MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
	Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
	OSPF	RFC 2328 OSPFv2 RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6
	QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
	Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell

HP E5406-44G-PoE+/4SFP zl Switch (J9447A)	**Included accessories**		1 HP 20-port Gig-T / 4-port SFP vl Module (J9307A) 1 HP 20p 10/100/1000 PoE+/4p SFP zl Module (J9308A) 1 HP 1500W PoE+ zl Power Supply (J9306A)
	Ports		44 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 open mini-GBIC slots 4 open module slots Supports a maximum of 16 10-GbE ports or 140 auto-sensing 10/100/1000 ports or 100 mini-GBICs, or a combination
	Power supplies		1 power-supply slots includes: 1 x J9306AHP 1500W PoE+ zl Power Supply
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 6.9(h) in. (45.09 x 44.45 x 17.53 cm) (4U height)
		Weight	34.9 lb. (15.83 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM

	10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
	Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
	10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
	Throughput	up to 282.1 million pps
	Routing/Switching capacity	379.2 Gbps
	Switch fabric speed	379.2 Gbps
	Routing table size	10,000 entries
	MAC address table size	64,000 entries
Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
	Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
	Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
Electrical characteristics	**Description**	One J9306A installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
	Voltage	110-127 / 200-240 VAC
	Idle power	215 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V

	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management		HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)
Notes		When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
Services		3-year, 4-hour onsite, 13x5 coverage for hardware (UE250E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE251E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE252E) 3-year, 24x7 SW phone support, software updates (UF786E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR900E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR901E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR902E) 4-year, 24x7 SW phone support, software updates (UR903E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR904E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR905E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR906E) 5-year, 24x7 SW phone support, software updates (UR907E) 3 Yr 6 hr Call-to-Repair Onsite (UW377E) 4 Yr 6 hr Call-to-Repair Onsite (UW378E) 5 Yr 6 hr Call-to-Repair Onsite (UW379E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEEE 802.1ad Q-in-Q (Premium License) IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree

	IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP (Premium License) RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode (Premium License) RFC 4601 Draft 10 PIM Sparse Mode (Premium License)
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication

	RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 (Premium License) RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
OSPF	RFC 2328 OSPFv2 (Premium License) RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6 (Premium License)
QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)

	Security		IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell
HP E5412-92G-PoE+/4SFP zl Switch (J9448A)	**Included accessories**		3 HP 24-port 10/100/1000 PoE+ zl Modules (J9307A) 1 HP 20p 10/100/1000 PoE+/4p SFP zl Module (J9308A) 2 HP 1500W PoE+ zl Power Supplies (J9306A)
	Ports		92 autosensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 open mini-GBIC slots 8 open module slots Supports a maximum of 32 10-GbE ports or 284 autosensing 10/100/1000 ports or 196 mini-GBICs, or a combination
	Power supplies		2 power-supply slots includes: 2 x J9306AHP 1500W PoE+ zl Power Supply
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 12.1(h) in. (45.09 x 44.45 x 30.73 cm) (7U height)
		Weight	58.18 lb. (26.39 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash Mb, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting		Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
		Throughput	up to 564.2 million pps
		Routing/Switching capacity	758.4 Gbps
		Switch fabric speed	758.4 Gbps
		Routing table size	10,000 entries
		MAC address table size	64,000 entries
	Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
		Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
		Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)

	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296
Electrical characteristics	**Description**	Two J9306A installed. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr) (max. using PoE)
	Voltage	110-127 / 200-240 VAC
	Idle power	312 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE253E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE254E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE255E) 3-year, 24x7 SW phone support, software updates (UF788E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing	

		(U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR916E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR917E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR918E) 4-year, 24x7 SW phone support, software updates (UR919E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR920E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR921E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR922E) 5-year, 24x7 SW phone support, software updates (UR923E) 3 Yr 6 hr Call-to-Repair Onsite (UW380E) 4 Yr 6 hr Call-to-Repair Onsite (UW381E) 5 Yr 6 hr Call-to-Repair Onsite (UW382E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEEE 802.1ad Q-in-Q (Premium License) IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only)

	RFC 3768 VRRP (Premium License) RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode (Premium License) RFC 4601 Draft 10 PIM Sparse Mode (Premium License)
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 (Premium License) RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB

			RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
		Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
		OSPF	RFC 2328 OSPFv2 (Premium License) RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6 (Premium License)
		QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
		Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell
HP E5406 zl Switch Chassis (J8697A)	**Ports**	6 open module slots Supports a maximum of 24 10-GbE ports or 144 autosensing 10/100/1000 ports or 144 mini-GBICs, or a combination	
	Power supplies	2 power-supply slots	
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 6.9(h) in. (45.09 x 44.45 x 17.53 cm) (4U height)
		Weight	23.55 lb. (10.68 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM

Technical Specifications

Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
	10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
	Throughput	up to 240.2 million pps
	Routing/Switching capacity	322.8 Gbps
	Switch fabric speed	345.6 Gbps
	Routing table size	10,000 entries
Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
	Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
	Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
Electrical characteristics	**Description**	Chassis ships without power supplies. Two power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	2450 BTU/hr (2584 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
	Voltage	100-127 / 200-240 VAC
	Frequency	50 / 60 Hz
	Notes	Power supplies must be ordered separately. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2

	Flicker	EN 61000-3-3, IEC 61000-3-3
Management		HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)
Notes		When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
Services		3-year, 4-hour onsite, 13x5 coverage for hardware (UE250E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE251E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE252E) 3-year, 24x7 SW phone support, software updates (UF786E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR900E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR901E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR902E) 4-year, 24x7 SW phone support, software updates (UR903E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR904E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR905E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR906E) 5-year, 24x7 SW phone support, software updates (UR907E) 3 Yr 6 hr Call-to-Repair Onsite (UW377E) 4 Yr 6 hr Call-to-Repair Onsite (UW378E) 5 Yr 6 hr Call-to-Repair Onsite (UW379E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEEE 802.1ad Q-in-Q (Premium License) IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP

	RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP (Premium License) RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode (Premium License) RFC 4601 Draft 10 PIM Sparse Mode (Premium License)
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements

	RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 (Premium License) RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
OSPF	RFC 2328 OSPFv2 (Premium License) RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6 (Premium License)
QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL)

			SSHv1/SSHv2 Secure Shell
HP E5412 zl Switch Chassis (J8698A)	**Ports**	12 open module slots Supports a maximum of 48 10-GbE ports or 288 autosensing 10/100/1000 ports or 288 mini-GBICs, or a combination	
	Power supplies	4 power-supply slots	
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 12.1(h) in. (45.09 x 44.45 x 30.73 cm) (7U height)
		Weight	34.94 lb. (15.85 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
		Throughput	up to 480.3 million pps
		Routing/Switching capacity	645.6 Gbps
		Switch fabric speed	691.2 Gbps
		Routing table size	10,000 entries
	Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
		Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
		Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
		Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
		Altitude	up to 10,000 ft. (3 km)
		Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296
	Electrical characteristics	**Description**	One J8712A installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications.
		Maximum heat dissipation	4900 BTU/hr (5169 kJ/hr), (max. non-PoE); 7400 BTU/hr (7,807 kJ/hr) (max. using PoE)
		Voltage	100-127 / 200-240 VAC
		Frequency	50 / 60 Hz

	Notes	Power supplies must be ordered separately. Two power supplies are required to power the J8698A chassis. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE253E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE254E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE255E) 3-year, 24x7 SW phone support, software updates (UF788E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR916E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR917E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR918E) 4-year, 24x7 SW phone support, software updates (UR919E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR920E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR921E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR922E) 5-year, 24x7 SW phone support, software updates (UR923E) 3 Yr 6 hr Call-to-Repair Onsite (UW380E) 4 Yr 6 hr Call-to-Repair Onsite (UW381E) 5 Yr 6 hr Call-to-Repair Onsite (UW382E) Refer to the HP website at: www.hp.com/networking/services for details	

on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEEE 802.1ad Q-in-Q (Premium License) IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP (Premium License) RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
	IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode (Premium License) RFC 4601 Draft 10 PIM Sparse Mode (Premium License)
	IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks

	RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 (Premium License) RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1

			(statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
		OSPF	RFC 2328 OSPFv2 (Premium License) RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6 (Premium License)
		QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
		Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell

HP E5406-48G zl Switch (J8699A)	**Included accessories**		2 HP 24-port 10/100/1000 PoE zl Modules (J8702A) 1 HP 875W zl Power Supply (J8712A)
	Ports		48 autosensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 4 open module slots Supports a maximum of 16 10-GbE ports or 144 autosensing 10/100/1000 ports or 96 mini-GBICs, or a combination
	Power supplies		1 power-supply slots includes: 1 x J8712AHP 875 W zl Power Supply
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 6.9(h) in. (45.09 x 44.45 x 17.53 cm) (4U height)
		Weight	34.26 lb. (15.54 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting		Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)

	Throughput	up to 282.1 million pps
	Routing/Switching capacity	379.2 Gbps
	Switch fabric speed	379.2 Gbps
	Routing table size	10,000 entries
	MAC address table size	64,000 entries
Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
	Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
	Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
	Altitude	up to 10,000 ft. (3 km)
	Acoustic	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
Electrical characteristics	**Description**	One J8712A installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications.
	Maximum heat dissipation	2450 BTU/hr (2584 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
	Voltage	100-127 / 200-240 VAC
	Idle power	166 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B,	

		J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
Services		3-year, 4-hour onsite, 13x5 coverage for hardware (UE250E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE251E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE252E) 3-year, 24x7 SW phone support, software updates (UF786E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR900E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR901E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR902E) 4-year, 24x7 SW phone support, software updates (UR903E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR904E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR905E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR906E) 5-year, 24x7 SW phone support, software updates (UR907E) 3 Yr 6 hr Call-to-Repair Onsite (UW377E) 4 Yr 6 hr Call-to-Repair Onsite (UW378E) 5 Yr 6 hr Call-to-Repair Onsite (UW379E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEEE 802.1ad Q-in-Q (Premium License) IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP

	RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP (Premium License) RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode (Premium License) RFC 4601 Draft 10 PIM Sparse Mode (Premium License)
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch

	RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 (Premium License) RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
OSPF	RFC 2328 OSPFv2 (Premium License) RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6 (Premium License)
QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell

Technical Specifications

HP E5412-96G zl Switch (J8700A)	**Included accessories**	4 HP 24-port 10/100/1000 PoE zl Modules (J8702A) 2 HP 875W zl Power Supplies (J8712A)	
	Ports	96 autosensing 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T); Media Type: Auto-MDIX; Duplex: 10Base-T/100Base-TX: half or full; 1000Base-T: full only 8 open module slots Supports a maximum of 32 10-GbE ports or 288 autosensing 10/100/1000 ports or 192 mini-GBICs, or a combination	
	Power supplies	2 power-supply slots includes: 2 x J8712AHP 875 W zl Power Supply	
	Physical characteristics	**Dimensions**	17.75(d) x 17.5(w) x 12.1(h) in. (45.09 x 44.45 x 30.73 cm) (7U height)
		Weight	58 lb. (26.31 kg)
	Memory and processor	**Gigabit Module**	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
		10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
		Management Module	Freescale PowerPC 8540 @ 666 MHz, 4 MB flash Mb, 128 MB compact flash, 256 MB DDR SDRAM
	Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
	Performance	**1000 Mb Latency**	< 3.7 µs (FIFO 64-byte packets)
		10 Gbps Latency	< 2.1 µs (FIFO 64-byte packets)
		Throughput	up to 564.2 million pps
		Routing/Switching capacity	758.4 Gbps
		Switch fabric speed	758.4 Gbps
		Routing table size	10,000 entries
		MAC address table size	64,000 entries
	Environment	**Operating temperature**	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
		Operating relative humidity	15% to 95% @ 131°F (55°C), non-condensing
		Non-operating/ Storage temperature	-40°F to 158°F (-40°C to 70°C)
		Non-operating/ Storage relative humidity	15% to 95% @ 149°F (65°C), non-condensing
		Altitude	up to 10,000 ft. (3 km)
		Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296
	Electrical characteristics	**Description**	Two J8712A installed. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications

	Maximum heat dissipation	4900 BTU/hr (5169 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr) (max. using PoE)
	Voltage	100-127 / 200-240 VAC
	Idle power	299 W
	Frequency	50 / 60 Hz
	Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	
Immunity	**EN**	EN 55024, CISPR 24
	ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD
	Radiated	IEC 61000-4-3; 3 V/m
	EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
	Surge	IEC 61000-4-5; 1 kV/2 kV AC
	Conducted	IEC 61000-4-6; 3 V
	Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
	Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	
Notes	When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g. J4858B, J4859C) are required. J8177B Gigabit 1000Base-T mini-GBIC is not supported on the 3500yl series switches. When using mini-GBICs with this product, mini-GBICs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	
Services	3-year, 4-hour onsite, 13x5 coverage for hardware (UE253E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UE254E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UE255E) 3-year, 24x7 SW phone support, software updates (UF788E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UR916E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UR917E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UR918E) 4-year, 24x7 SW phone support, software updates (UR919E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UR920E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UR921E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software	

		phone (UR922E) 5-year, 24x7 SW phone support, software updates (UR923E) 3 Yr 6 hr Call-to-Repair Onsite (UW380E) 4 Yr 6 hr Call-to-Repair Onsite (UW381E) 5 Yr 6 hr Call-to-Repair Onsite (UW382E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
Standards and protocols	**Device Management**	RFC 1591 DNS (client) HTML and telnet management
	General Protocols	IEEE 802.1ad Q-in-Q (Premium License) IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP (Premium License) RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)

IP Multicast	RFC 3376 IGMPv3 (host joins only) RFC 3973 Draft 2 PIM Dense Mode (Premium License) RFC 4601 Draft 10 PIM Sparse Mode (Premium License)
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 (host joins only) RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 (Premium License) RFC 5453 Reserved IPv6 Interface Identifiers RFC 5722 Handling of Overlapping IPv6 Fragments
MIBs	RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB

	RFC 2620 RADIUS Accounting MIB RFC 2665 Ethernet-Like-MIB RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
Network Management	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
OSPF	RFC 2328 OSPFv2 (Premium License) RFC 3101 OSPF NSSA RFC 5340 OSPFv3 for IPv6 (Premium License)
QoS/Cos	RFC 2474 DiffServ Precedence, including 8 queues/port RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF)
Security	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL) SSHv1/SSHv2 Secure Shell

Accessories

HP E5400 zl Switch Series accessories	**Modules**	
	NEW HP 20-port Gig-T PoE+ / 4-port SFP v2 zl Module	J9535A
	NEW HP 20-port Gig-T PoE+ / 2-port 10-GbE SFP+ v2 zl Module	J9536A
	NEW HP 24-port SFP v2 zl Module	J9537A
	NEW HP 8-port 10 GbE SFP+ v2 zl Module	J9538A
	NEW HP 24-port 10/100 PoE+ v2 zl Module	J9547A
	NEW HP 12-port Gig-T PoE+ / 12-port SFP v2 zl Module	J9637A
	HP 24-port 10/100/1000 PoE zl Module	J8702A
	HP 4-port 10GbE CX4 zl Module	J8708A
	HP 24-port 10/100 PoE+ zl Module	J9478A
	HP 20p 10/100/1000 PoE+/4p SFP zl Mod	J9308A
	HP 4-port 10GbE SFP+ zl Module	J9309A
	HP 20-p Gig-T / 4-p Mini-GBIC zl Module	J8705A
	HP 24-port Mini-GBIC zl Module	J8706A
	HP 4-port 10GbE X2 zl Module	J8707A
	HP 24-port 10/100/1000 PoE+ zl Module	J9307A
	NEW HP AllianceONE Extended Services zl Module with Riverbed Steelhead RiOS Application	J9517A
	NEW HP AllianceONE Services zl Module for Avaya Aura Session Border Controller powered by Acme Packet	J9486A
	NEW HP 24-port Gig-T PoE+ v2 zl Module	J9534A
	NEW HP 24-port Gig-T v2 zl Module	J9550A
	NEW HP 20-port Gig-T / 4-port SFP v2 zl Module	J9549A
	NEW HP 20-port Gig-T / 2-port 10-GbE SFP+ v2 zl Module	J9548A
	HP Threat Management Services zl Module	J9155A
	Transceivers	
	HP X131 10G X2 SC ER Transceiver	J8438A
	HP X130 CX4 Optical Media Converter	J8439A
	HP X131 10G X2 SC SR Transceiver	J8436A
	HP X131 10G X2 CX4 Transceiver	J8440C
	HP X111 100M SFP LC FX Transceiver	J9054B
	HP X131 10G X2 SC LR Transceiver	J8437A
	HP X131 10G X2 SC LRM Transceiver	J9144A
	HP X112 100M SFP LC BX-D Transceiver	J9099B
	HP X112 100M SFP LC BX-U Transceiver	J9100B
	HP X132 10G SFP+ LC SR Transceiver	J9150A
	HP X132 10G SFP+ LC LR Transceiver	J9151A
	HP X132 10G SFP+ LC LRM Transceiver	J9152A
	HP X121 1G SFP LC LH Transceiver	J4860C
	HP X121 1G SFP LC SX Transceiver	J4858C
	HP X121 1G SFP LC LX Transceiver	J4859C
	HP X121 1G SFP RJ45 T Transceiver	J8177C
	HP X122 1G SFP LC BX-D Transceiver	J9142B
	HP X122 1G SFP LC BX-U Transceiver	J9143B
	HP X132 10G SFP+ LC ER Transceiver	J9153A
	Cables	

Accessories

HP X242 SFP+ SFP+ 1m Direct Attach Cable	J9281B
HP X242 SFP+ SFP+ 3m Direct Attach Cable	J9283B
HP X242 SFP+ SFP+ 7m Direct Attach Cable	J9285B
HP X244 XFP SFP+ 1m Direct Attach Cable	J9300A
HP X244 XFP SFP+ 3m Direct Attach Cable	J9301A
HP X244 XFP SFP+ 5m Direct Attach Cable	J9302A
NEW HP 0.5 m Multimode OM3 LC/LC Optical Cable	AJ833A
NEW HP 1 m Multimode OM3 LC/LC Optical Cable	AJ834A
NEW HP 2 m Multimode OM3 LC/LC Optical Cable	AJ835A
NEW HP 5 m Multimode OM3 LC/LC Optical Cable	AJ836A
NEW HP 15 m Multimode OM3 LC/LC Optical Cable	AJ837A
NEW HP 30 m Multimode OM3 LC/LC Optical Cable	AJ838A
NEW HP 50 m Multimode OM3 LC/LC Optical Cable	AJ839A
NEW HP 0.5 m PremierFlex OM3+ LC/LC Optical Cable	BK837A
NEW HP 1 m PremierFlex OM3+ LC/LC Optical Cable	BK838A
NEW HP 2 m PremierFlex OM3+ LC/LC Optical Cable	BK839A
NEW HP 5 m PremierFlex OM3+ LC/LC Optical Cable	BK840A
NEW HP 15 m PremierFlex OM3+ LC/LC Optical Cable	BK841A
NEW HP 30 m PremierFlex OM3+ LC/LC Optical Cable	BK842A
NEW HP 50 m PremierFlex OM3+ LC/LC Optical Cable	BK843A
Power Supply	
HP 875W zl Power Supply	J8712A
HP 1500W zl Power Supply	J8713A
HP 1500W PoE+ zl Power Supply	J9306A
EPS/RPS	
HP zl Power Supply Shelf	J8714A
License	
HP E-MSM760/765 40-access point license	J9371A
HP E5400 zl Switch Premium License	J8994A
WLAN	
HP E-MSM765zl Mobility Controller	J9370A
Appliance	
HP AllianceONE Services zl Module	J9289A
HP Threat Management Services zl Module with 1-year IDS/IPS subscription	J9156A
HP PCM+ Agent with ONE Services zl Module	J9496A
NEW HP AllianceONE Advanced Services zl Module	J9483A

To learn more, visit: www.hp.com/networking

© Copyright 2009-2011 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.